Knee pain in children

Knee pain in children can have a multitude of causes, but it is important to be aware that hip pathology such as Perthes disease and slipped Upper Femoral Epiphysis commonly present as knee pain (Figure 1) and this can lead to a dangerous delay in diagnosis as a set of normal knee x-rays may lead to false reassurance. Diagnosing the cause of knee pain in a child may also be difficult as symptoms may be vague, and they often find it difficult to describe their pain. Anxiety about the possible treatment options may also lead them to play down their symptoms, although parents are usually very helpful in this regard.

This article is intended to give a brief overview of, and some pointers to aid in the diagnosis of the most important and the most common causes of knee pain in children (but not including bony injuries which are beyond the scope of this short article). Knee pain is commonly attributed to “growing pains” which should really only be a diagnosis of exclusion and only if the symptoms fit a fairly classical chronic and intermittent pattern of usually night pain with no other disturbance.

Tumours

Tumours around the knee are relatively rare, but as the only symptom with little else to find can be very worrying. Pain which is classic of an osteoid ostema but high on the differential is often related to a parathyroid lesion or a soft tissue injury. Soft tissue injuries are often associated with a short history of work or exercise, and will feel tender to palpation with no sign of a neoplastic lesion. Malignant bone tumours are rare, and have a predilection for occurring adjacent to the growth plate. Osteopenia (low bone density) can be a presenting symptom of a malignancy, and can be an important feature to consider in the assessment of knee pain (Figure 2). A plain radiograph should be the first line of investigation.

Reactive arthritis and inflammatory arthritis

As in adults, reactive arthritis can occur in children, complicating viral infections. The differential diagnosis is septic arthritis and inflammatory arthritis. There is usually a clear history of a preceding viral infection. Reactive arthritis usually has a chronic presentation with a limp more common than acute pain. Discomfort is characteristically felt as morning stiffness, or stiffness after prolonged periods of immobility. Children are often able to undertake strenuous activity later in the day. A warm limb improves symptoms. Other joints may be involved. Examination often reveals synovial thickening in the suprapatellar pouch with muscle wasting and possibly an effusion (see Figure 3).

Anterior knee pain and patello-femoral maltracking

Figure 1. Plain radiograph of the pelvis showing a slipped upper femoral epiphysis; this diagnosis is frequently missed as children commonly present with knee pain. Hip examination and X-rays are frequently delayed.

Figure 2. Plain radiograph showing the classic appearance of an osteoid ostema in the proximal femur which presented as knee pain.

Figure 3. Clinical picture showing synovial thickening and obliteration of the normal outlines of the suprapatellar pouch in the left knee compared with the normal right knee.
Anterior knee pain is very common and is at the mildest end of the spectrum of patello-femoral symptoms, the most severe of which is patellar subluxation and dislocation. Anterior knee pain describes pain which is felt around and under the patella, is worse following prolonged periods of sitting (otherwise known as cinema knee) and on climbing stairs. It is most common in adolescent girls and is usually improved or cured by VMO (vastus medialis oblique) strengthening exercises which aim to realign the strong lateral pull of the vastus lateralis on the patella.

At the other end of the spectrum is recurrent dislocation and subluxation. These patients require referral as there are often underlying soft tissue or bony abnormalities.

Osgood-Schlatter’s disease

Osgood-Schlatter’s disease is a disorder of the formation and growth of the proximal tibial apophysis occurring in adolescents during the time of its ossification. Patients present with anterior knee pain centred over the tibial tubercle which comes on with exercise, with focal tenderness and swelling at this point. It is relieved by rest. X-rays show fragmentation of the apophysis, but are not necessary to make the diagnosis as it is usually obvious clinically. Treatment is symptomatic with rest, ice, analgesics and sometimes physiotherapy. Cessation or reduction of sporting activities depends on the individual patient and their pain level.

Osteochondritis dissecans

This condition is caused by necrosis of a focal area of subchondral bone. Most commonly affecting the lateral part of the medial femoral condyle. When the overlying cartilage loses its supporting structure, a fragment may be displaced into the joint as a loose body. Repeated micro-trauma is thought to be an important initiating factor. Symptoms are chronic, often vague and include activity related pain, stiffness after rest, catching or giving way.

Radiographs are usually diagnostic. “Tunnel views” are obtained (see Figure 4). An MRI scan is used to assess severity and guide treatment. In general, girls <11 and boys <13 years can be managed conservatively and will often settle with a period of restriction of activity. In older children the prognosis is more guarded and arthroscopy is usually indicated, when the lesion can be fixed to encourage healing, reattached, or loose bodies removed.

Soft tissue knee injuries

Sporting injuries in children are becoming increasingly common with participation in aggressive and competitive sports occurring at a younger age.

Immediate swelling following an injury is highly suggestive of a haemarthrosis, caused by either a rupture within the joint capsule, or an intra-articular ligament rupture such as the anterior cruciate ligament. The delayed onset of an effusion (two hours plus) following injury is more suggestive of a meniscal tear.

Plain radiographs are important to exclude a bony injury, at the very least AP and lateral views, and if a patellar dislocation is suspected then skyline views as well. If these are normal, immediate management should include a tubigrip, crutches, ice, analgesia and anti-inflammatories and early specialist review.

Depending on the persistence of symptoms and signs, an MRI scan may be indicated.

Acute patella-femoral dislocations (Figure 5)

Acute dislocation of the patella is often a painful, trauma-related event. Urgent referral is required. Reduction can often be performed closed with analgesia and sedation, but can sometimes require general anaesthetic or operation, particularly if there is avulsion of a bony fragment from the medial facet of the patella or the lateral condyle of the femur.

After reduction the knee will be immobilised in a brace or occasionally in plaster. Physiotherapy is started early on to minimise muscle wasting.

Anterior cruciate ligament injury

Although ACL injuries are less common in children than adults – one percent of all ACL injuries occur in children – they must not be overlooked.

Most injuries occur during sport and are often the result of abnormal twisting, landing or hyperextension.

Assessment is as for adult injuries. However, studies have shown a poor prognosis for the conservatively managed paediatric ACL rupture, probably due to an increased risk of medial meniscal injury in the unstable knee, which in turn increases the risk of early degenerative arthritis. Thus, the management approach is somewhat more aggressive in children, in spite of the overall lower incidence of associated injuries and minor symptoms in the child. Surgical reconstruction is more commonly performed and can use techniques as those for adults. However, new technologies are being developed to reduce the risk of growth disturbance. Pre and post-operative physiotherapy are vital to enable successful rehabilitation.
Meniscal tears

As with ACL injuries, meniscal injuries are less common in children than adults. They most often result from a twisting injury to the knee, and are more common when the ACL has been injured. Approximately 0.5 - 1% of children have a structural predisposition to lateral meniscal tear known as a discoid lateral meniscus which is thicker and covers more of the tibial plateau than it should do – normally a semilunar shape (see Figure 6). Symptoms include visible and palpable “clunking” and sometimes pain, particularly if torn. The incidental finding of a discoid meniscus, for example on an MRI scan done for other reasons, does not require any intervention. However, symptoms of pain, or the presence of a tear usually requires arthroscopic debridement – a meniscal repair.

Some peripheral tears of the meniscus have the potential to heal with conservative management and restriction of activity, however most will require operative intervention with arthroscopy. The aim is to preserve as much of the meniscus as possible by suturing, as children’s menisci have a good potential to heal and erasing a large portion of the meniscus can predispose to early degenerative changes. This decision can only be made at operation. Concurrent reconstruction of an injured ACL seems to confer a positive prognosis for healing of repaired menisci, improving success rates from 75 to 85 percent.

Rehabilitation includes bracing and specialised physiotherapy and again we feel that these procedures should take place in dedicated units experienced in paediatric knee surgery.

Figure 6. MRI image showing the abnormal appearance of a lateral discoid meniscus in the right knee.

For further information about our services please contact our GP Liaison Team on +44 (0)20 7460 5973.